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DIESEL SUBMARINE ADVERSARIES, POTENT OR IMPOTENT?

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ABSTRACT

The fundamental idea that the diesel submarines of potential enemies probably do not constitute a significant threat to the operational commander conducting operations ...From the Sea is presented. This concept is developed by examining the experiences of the United States submarine force in the Pacific in the first eighteen months of World War II, and from the submarine related experiences of the British and Argentineans in the Falklands Crisis.

The historical lessons from the examples chosen suggest that mere ownership of a capable submarine platform and torpedoes is not enough to ensure or even suggest tactical success. Instead, it is only the first step. Adequate peacetime training is the vital second step. Unfortunately for many of our adversaries, the means to achieve adequate training is beyond their grasp, hence their submarines are probably not a significant threat to our forces. We should re-think our plans accordingly, seeing if this idea can restore options thought denied.

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As the United States Navy wrestles with the challenges of littoral warfare as presented in ...From the Sea one hears quite a bit about the threat posed by potential adversaries' diesel submarines, shore based anti-ship missile batteries, and mines. Although all these threats could severely affect the design of operations in littoral waters and deserve careful consideration by an operational commander, this paper will only address certain aspects of the diesel submarine threat.

Many countries have acquired diesel submarines. A handful of these states deserve particular consideration by planners since they combine two undesirable traits: They have a history of being unfriendly to us, and they have very capable submarines. Several of these problem countries have Russian Kilo's in their order of battle, others have German Type-209's or newer models, and a few are building their own classes based on readily available technology. All of these platforms, if manned by competent, dedicated crews, could pose a serious threat to our naval forces in a conflict.

This paper however, will argue that contrary to popular wisdom these submarines are probably not very dangerous. Since our potential adversaries suffer from what is almost certainly inadequate training, the officers and crews of potentially hostile submarines are unprepared to offer a serious torpedo threat to our ships. This is probably true regardless of the quality of platform from which they operate.

Consequently, operational commanders have more freedom of action in submarine contested littoral waters than is commonly believed.

Many do not agree. They offer the argument that modern diesel submarines, equipped with user-friendly fire control and sonar systems, could devastate a battle group and destroy the design of an operational commander. They may envision an Iranian Kilo torpedoing a nuclear carrier as it enters the Persian Gulf, or any other of a number of equally chilling scenarios. As disturbing as thoughts like this are, they suffer a fatal flaw: A failure to remember the maxim You Fight As You Train.

In order to employ a submarine effectively its crew must have a high degree of proficiency in detecting, identifying, targeting, and then shooting hostile warships. Prior to war, this can only be obtained through training. Over the years many countries including ours, have devoted some of their best minds and assets in attempts to become proficient in the skills necessary to use submarines effectively in war, but few, if any, have demonstrated immediate success. Inadequate peacetime training is always the cause.

The reasons for this are fairly simple, but very difficult or expensive to correct. One may be the opposing forces in the training scenario are inept, excessive, or otherwise inappropriate. A second could be the opposing forces fail to use tactics similar to the enemies'. A third,

and common reason is a general failure to develop proficiency in shooting torpedoes. Another related problem could be that even though exercise torpedoes are fired often and well, war reserve torpedoes are not. Any one of these training problems can be debilitating in war.

Peacetime training has the effect of exercising a given force, but may not adequately prepare it for war. This is a crucial distinction for the operational commander and staff to remember, and has important repercussions for both sides of any conflict. As an example, consider the case of the our own Submarine Force and its operations in the Pacific in World War Two.

After relieving his predecessor in January 1941 Rear Admiral Thomas Withers, Commander of Submarines Pacific (now known as COMSUBPAC) realized war with the Japanese was imminent and his force was woefully unprepared for it.¹ As an operational commander he was determined to correct this omission, and directing dramatic changes in training was his logical first step. Admiral Withers believed current training was inadequate and unnecessarily restricted submarine commanders due to excessive safety precautions.² Exercise torpedo firings also suffered from a lack of wartime reality, consisting of canned scenarios well known by both sides of the problem. Admiral Withers threw out existing training rules and scenarios, and initiated a program that drilled submarine commanders in the firing of exercise torpedoes against

American warships escorted by anti-submarine aircraft.³ This program, though designed to prepare submarines for war by simulating wartime conditions as closely as possible, fell short of its goal. The early performance of the submarine force against Japanese forces demonstrated significant American weaknesses in tactics, torpedoes, and commanding officers,⁴ all items COMSUBPAC's peacetime training program tried to correct.

In exercise torpedo firings, Admiral Withers insisted each torpedo must be aimed specifically to hit its target.⁵ Previous tactics directed firing a spread of torpedoes around the center point of a target. Another tactical aspect emphasized was the desirability of firing from close range while remaining submerged, with the torpedo striking the target at a right angle. All these changes were designed to increase the incidence of ordnance on target, and they would have, were it not for an unforeseen error.

Then as now, inert exercise torpedoes were not set to hit their targets, but to instead pass under their keels. If the torpedo's wake passed directly under the keel of the target ship, the shot was judged to be a hit, and the training and tactics exercised considered effective. Crews, commanding officers, and the submarines themselves were all tested under demanding conditions. It appears that the torpedoes were too, since after firing, each exercise torpedo was recovered, refurbished in the torpedo shop on shore, and sent back to the

fleet. Torpedoes that performed satisfactorily could have their exercise heads removed, and warheads and exploders installed. Through this testing method any fault that appeared in an individual torpedo could be determined and corrected, and wartime torpedo performance would be ensured.

Unfortunately, the exact opposite was true. Since the entire process never tested the torpedo exploders through detonation against the sides of a ship, the exploders remained essentially untested, and frequently failed to detonate when the torpedoes clearly hit their targets.⁶ Positive identification of the cause of the exploder problem and effective repairs took almost two years and cost us many ships.⁷ Another early problem was that many torpedoes were observed to run directly under their targets without exploding. Subsequent tests showed the torpedoes ran eleven feet deeper than desired. This problem, which was also not detected during exercise firings, did not get fixed until the summer of 1942.⁸

Similarly, the changes in tactics implemented by Admiral Withers were only partially effective. Together, these problems prevented submarines from being successful on a tactical level, and this limited their effectiveness on an operational level as an instrument of attrition. As an example, consider the second war patrol of the USS Wahoo.

On 8 November 1942, eleven months after the attack on Pearl Harbor, the Wahoo conducted a patrol near the Solomon

Islands, rigidly adhering to Admiral Withers' doctrines. At night, Wahoo patrolled on the surface. During daylight hours the Wahoo patrolled at a depth of ninety feet, searching by passive sonar only. Every half hour the sub came to periscope depth for a visual search with three feet of periscope exposed. This resulted in a visual search radius of about six miles.⁹ Using these search tactics Wahoo detected nine targets, and of these, only a merchant and a Japanese submarine were attacked and sunk. An 18,000 ton tanker supplying Japanese forces in the Guadalcanal campaign slipped by unscathed, as did a destroyer, a sea plane tender, and four large merchants.¹⁰

Why were Wahoo's tactics so ineffective? The answer lies in two elements. First, in order to attack a target, a submarine must detect it first. Following detection, the submarine must analyze the targets course and speed, and then position itself along the target's track. Once a suitable firing position is obtained, the target can be attacked from close range. Obviously this process demands a certain amount of maneuverability on the part of the submarine. By staying submerged while searching and attacking Wahoo was limited to a speed of four knots and this lack of maneuverability prevented Wahoo from achieving attack positions in many cases.¹¹

Another factor lay in the search methods Wahoo employed. Wahoo's sonar system was relatively primitive and lacked sensitivity. Consequently, passive sonar searches failed to

hear some contacts that could have conceivably been attacked. Wahoo's visual search techniques also limited her effectiveness. During the half hour between searches a target could pass through sectors of the visual search area without being detected, approached, and attacked. Additionally, raising the periscope more than three feet above the surface would have increased the area searched, and may have uncovered more targets. As later patrols demonstrate, Wahoo would have been far better served by visually searching while remaining on the surface. All of these faults stemmed from tactics developed during peacetime training. In turn, these tactics prevented the submarine from being operationally effective, which unnecessarily delayed the effects of our strategy of attrition. Why did this occur?

Recall that one of the keystones of Admiral Withers' training program was submarines practiced attacks against surface ships escorted by aircraft. Many of these attacks occurred in the waters near New London Ct. during Submarine Prospective Commanding Officer's School. Logically, the aircraft flying against the submarines were few in number, and their crews quickly learned where and when the submarines would make their approaches during the "canned" scenarios. Consequently, the exercise results always favored the aircraft. As a result, *pre-war and early war submarine prospective commanding officers gained an exaggerated appreciation of airplane's visual ASW capabilities and*

*adjusted their tactics to remain at sufficient depth during searches and approaches to prevent being detected by aircraft.*¹² Wahoo's second war patrol is a typical example of the result of such training. At the risk of overstating the obvious, this is a clear example of how peacetime training deficiencies had a severe effect on wartime operational effectiveness.

Another factor contributing to Wahoo's disappointing performance was the commanding officer. This man, a product of rigid peacetime attitudes and training, had spent several consecutive years on shore tour prior to assuming command, was rusty in submarine skills, timid, and generally unsuited for war command.¹³ Early in the war, many of our submarines suffered from similar problems.¹⁴

Fortunately, Wahoo's fortunes soon changed. In January 1943, on war patrol number three, Wahoo's new commanding officer threw away the old tactics. Remaining surfaced during daylight searches, Wahoo used her periscopes to search an area of seventeen miles radius, and used her radar to warn of incoming aircraft, temporarily diving as necessary to remain undetected. Once a target was detected, Wahoo used her surface speed of eighteen knots to reposition in front of the target while remaining outside visual counterdetection range. Subsequent attacks occurred on the surface at night, and while submerged during the day. Using these tactics Wahoo sank a destroyer nine days into the patrol, and three days later sank

all four merchants in a convoy north of New Guinea.¹⁵ This was revolutionary performance.¹⁶

As this example shows, it took submarines two full years to fix their problems. Peacetime training, though well intentioned, did not produce adequate results. Only wartime experiences did. Younger, adaptable commanding officers, employing innovative tactics bred from the crucible of war, turned submarines into potent weapons.¹⁷ The problem of the torpedo exploders however remained, and was not fixed until September 1943.¹⁸

As shown by Wahoo's experiences, United States submarines did not achieve their full operational potential until eighteen months into WWII. True, even in the first few months of the war submarines sank ships, but initially they were a long way from being a truly effective weapon. Remember too, that this delay occurred despite the tremendous national assets and resources devoted to prevent and then correct it. Could another country, especially one with limited assets be expected to do better? Isn't it logical instead to think they will have trouble making their torpedoes work, or their commanding officers aggressive, or their crews properly trained? Are we needlessly overcompensating on an operational level for a tactical threat that is not as large as we fear?

In exploring this question it is interesting to examine the submarine aspects of the Falklands war. Both the Argentineans and the British learned some surprising lessons

regarding their submarines in the conflict. It would be logical to expect that both countries had a capable force, each ready to perform basic warfighting skills. However, the General Belgrano incident notwithstanding, such was not the case.

During the war the Argentineans employed three of their four submarines against British forces. The Santa Fe, an ex-U.S. WWII submarine, was destroyed on the surface by aircraft while performing blockade running duties.¹⁹ The other submarines that patrolled against the British were two ten year old Type-209's, each armed with German SST 4 anti-ship torpedoes. These torpedoes are battery powered, have a speed of about thirty five knots, and are wire guided. Modern, technologically mature and capable, these torpedoes can home on a target either passively or actively.²⁰ It seems as though they would be quite a potent threat. However, they were not. Why?

After the war the Argentineans claimed that one of the 209's penetrated the British ASW screen and fired several torpedoes at British ships, but the torpedoes failed to explode.²¹ The reasons given for this failure are diverse. The submarine's fire control system may have failed, the torpedoes could have failed, or perhaps the torpedoes missed their target and then sank without exploding.²² Regardless, the fact remains: The system as a whole did not work.

One year after the war, in an effort to determine why, the Argentines fired more SST 4 torpedoes under simulated combat conditions, but again the torpedoes failed to explode.²³ To make matters worse, some sources claim the Argentines had experienced severe problems with these torpedoes before the war, but even then had been unable to locate and correct the problems.²⁴ It seems that even for a modern country that can jury-rig maritime version exocet missiles to fire from land, firing torpedoes from a capable, mature platform is a difficult and frustrating undertaking. It is not unreasonable to suppose that other, potentially hostile countries, many of which lack Argentina's resources, would also have problems performing the complex feat of accurately and effectively firing torpedoes.

The similarities between the Argentinean and American cases is remarkable. Both countries had extensive experience with submarines before war, and both expected their submarines to perform adequately. Both had ample time to detect and fix any problems, but in the end both were unsuccessful, to somewhat differing degrees. Clearly both country's problems stemmed from the same root cause: The training conducted before the war did not adequately prepare the crews, weapons, or ships for actual wartime conditions. The validity of this argument is apparent, for if the argument is invalid, the results of each war would have been entirely different. The Argentines would have sunk British ships, and American

submarines would not have suffered their setbacks at the beginning of WWII. These tactical failures have profound operational implications.

British experiences in the Falklands do not support a different conclusion. The Commanding Officer of the British submarine elected to use MK VIII WWII vintage torpedoes over the more modern tigerfish torpedo when he sank the General Belgrano. Why? Both types of torpedoes generate approximately the same destructive impact²⁵, so explosive effect may not be the answer as many believe. An alternative reason may instead be that over four thousand MK VIII torpedoes have been fired by the British over the years, and their strengths and limitations are well understood.²⁶ In the event, the torpedo worked as planned. This is a luxury few of our potential adversaries possess.

Another lesson from the Falklands stems from the British use of a modern nuclear powered submarine to sink the Belgrano. Using its superior maneuverability and underwater speed HMS Conqueror obtained an advantageous firing position, and then sank the Belgrano.²⁷ A diesel submarine, especially one operating against forces proficient in effective ASW, would not have been able to do this.

One last British experience is illustrative. During the war the British expended tremendous amounts of ordnance against suspected submarine contacts, but never sank an Argentinean submarine. This in spite of all their years of

practice in performing ASW in preparation for possible war with the Soviets under conditions similar to those experienced in the Falklands. The lack of Argentinean submarines on the bottom of the ocean illustrates British tactics were not as successful as they could have been. Perhaps this was because British peacetime training did not develop their ASW skills as much as they would have liked.

All of the above is fine, and perhaps interesting, but a legitimate question would be to ask how it relates to the operational commander. The answer is the examples provided suggest two fundamental principles. First, no matter how hard we try to train effectively, war time conditions will throw surprises at us we failed to consider when we designed our training scenarios. The only way around this problem is for us to train as we will fight, where we will fight, and under the conditions that will exist when we fight. We must also be intimately familiar with our weapons. Unfortunately, training that satisfies these requirements cannot be performed very often. It requires a large budget, a willing adversary, and a comprehensive understanding of enemy tactics. Obviously, since the operational commander cannot count on his forces having had such opportunities, he makes plans accordingly.

The second principle is that the same training problems that bedevil us must also plague our opponents. It is exceptionally difficult to shoot torpedoes from submarines.

True proficiency takes years of practice and requires intimate knowledge of fire control systems, torpedoes, and targets. This knowledge is very expensive, and is beyond the means of many of our potential adversaries. Therefore, in spite of much belief to the contrary we probably do not have much to fear from our potential adversaries' diesel submarines. If history is any guide at all, they are almost certainly not proficient war-fighters, and can probably be considered to be impotent. This has monumental implications for the commander and his staff as they try to implement ...From the Sea.

Alternative courses of action previously thought too risky may now be viable. Operational flexibility may be increased, operational design optimized, and the enemy confronted with unanticipated dilemmas. Our enemy's operational training weaknesses can aid our operational art, while hindering his. This is a powerful idea.

Still, even though enemy diesel subs are almost certainly less potent than we plan, the commander must always remember the enemy is not stupid, probably tries to train well, and is not always unlucky. Trained crews can be hired, technological improvements can make difficult tasks easier, and the enemy can always damage or sink one of our ships, even if by luck instead of skill. However, if such an event occurred, it would be because we took a risk, not because we gambled. War is filled with such risks.

NOTES

1. Thomas Withers, "The Preparation of the Submarines Pacific for War," Naval Institute Proceedings, April 1950, p. 387.
2. Ibid.
3. Ibid.
4. Richard H. O'Kane, Wahoo. (Novato Ca: Presidio Press, 1987) pp. 29, 56-102.
5. Ibid.
6. Charles A. Lockwood, Sink 'Em All, (New York: E.P. Dutton & Co., 1951), p.114.
7. Ibid.
8. Ibid, p. 21.
9. O'Kane, pp. 39 and 53.
10. Ibid, pp. 44-102.
11. Ibid.
12. Eugene B. Fluckey, Thunder Below, (Urbana and Chicago: University of Illinois Press, 1992), p. 283; Thomas Withers, "The Preparations of the Submarine Pacific for War," Naval Institute Proceedings, April 1950, p. 387.
13. Fluckey, pp. 119-162.
14. Ibid, p. 153.
15. Ibid, pp. 119-162.
16. Theodore Roscoe, United States Submarine Operations in World War II, (Annapolis: United States Naval Institute, 1965), pg. 207.
17. Fluckey, p. 153.
18. Lockwood, p. 115.
19. "Phoenix", "Submarine Lessons from the Falklands War," Submarine Review, April 1983, p. 36.
20. Ibid, p. 41.

21. Alphonse Max, "Controversy over Argentinian Torpedo Buy," Jane's Defense Weekly, 12 May 1984, p. 718.

22. Martin Douglas, "Naval Lessons from the South Atlantic," Jane's Defense Weekly, 7 April 1984, p. 523.

23. Max, p. 718.

24. Ibid.

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26. Ibid.

27. Ibid.

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